



EQUATOR[®]
Convective Warmer

REF EQ-5000

OPERATOR'S MANUAL

PN 4533900-EN Rev. 009

smiths medical

EQUATOR® Convective Warmer Operator's Manual

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This revision supercedes all previous revisions.

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SECTION 1

About this Manual

This Operator’s Manual describes the assembly, use, and maintenance of the EQUATOR® Convective Warmer. This manual is intended for use by individuals trained in the healthcare and biomedical professions.

WARNING: These instructions contain important information for safe use of the product. Read the entire contents of this Operator’s Manual, including Warnings and Cautions, before using this product. Failure to properly follow warnings, cautions, and instructions could result in death or serious injury to the patient.

Indications for Use

The EQUATOR® 5000 Convective Warmer System is intended for thermal regulation of a patient's temperature to prevent hypothermia by a warm air heated blanket system to reduce cold discomfort during and after surgical procedures. It intended for use by appropriately trained healthcare professionals in clinical environments.

Conventions Used in this Manual

This manual uses the following text and text conventions:

Convention	Description
Note	A Note statement alerts the user to important information that requires attention.
CONTRAINDICATION	A Contraindication statement alerts the user to conditions when the device should not be used.
WARNING	A Warning statement alerts the user to conditions that may cause death or serious injury to the patient or user.
CAUTION	A Caution statement alerts the user to conditions that may cause malfunction, failure, or damage to the device.

SECTION 2

Description

The EQUATOR[®] Convective Warming system consists of a high-flow convective warmer with hose-end temperature control, a convective warming blanket, and accessories.

The convective warmer draws ambient-temperature air through a particulate air filter. The filtered air is warmed to a selected temperature. The warmed air enters the convective warming blanket through the hose and is distributed through delivery channels. Perforations on the patient side of the air delivery channels in the blanket gently disperse warm air over the patient.

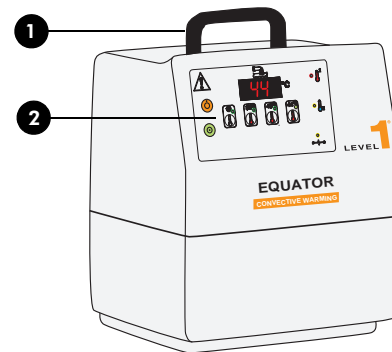
The convective warmer has three outlet temperature settings, which provide flexibility in patient treatment: 36°C, 40°C, and 44°C. These three temperature settings are servo-controlled by thermistors placed at the end of the hose where the hose connects to the convective warming blanket. A fourth temperature setting delivers ambient-temperature air. The temperature indicated on the control panel is the temperature of the air being delivered to the blanket at the end of the hose. A control thermistor adjusts the power applied to the heater to maintain the selected temperature. This enables the system to maintain the selected temperature under variations in ambient temperature.

A safety thermistor provides a signal to a separate high-temperature comparison circuit. The safety thermistor activates and causes an alarm if the temperature exceeds the set point. The safety circuit provides an independent means of shutoff, which discontinues power to the heater and motor. This prevents patient exposure to excessive temperatures.

Convective Warmer Components

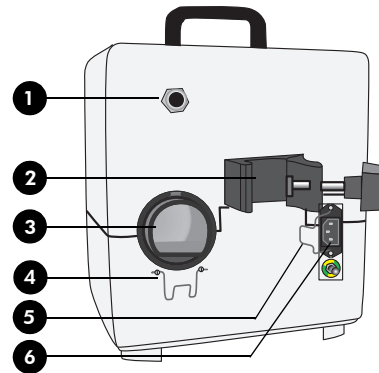
Front View

- 1 Handle** - used to lift and move the convective warmer
- 2 Control Panel** - contains controls and displays used during operation

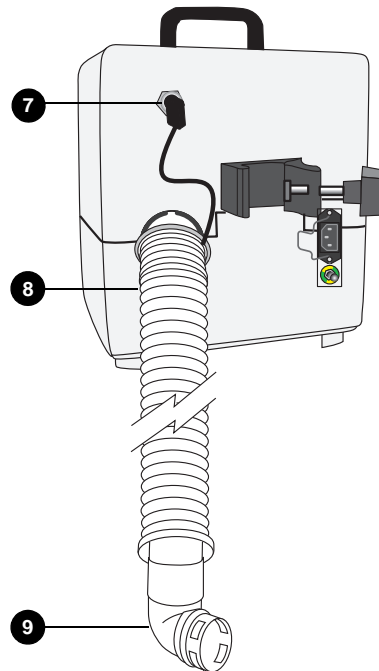


Rear View

- 1 Thermistor Receptacle** - connection for the thermistor cable
- 2 Pole Clamp** - mounts the convective warmer on a pole
- 3 Air Outlet** - opening where the hose attaches to the convective warmer
- 4 Hose Retainer Clip** - secures the hose to the air outlet
- 5 Power Cord Lock** - secures the power cord to the receptacle
- 6 Power Cord Receptacle** - connector for the power cord

**Rear View with Hose Attached**

- 7 Thermistor Cable** - connection from the hose used to transmit a signal from the hose end
- 8 Hose** - transports air to the convective warming blanket
- 9 Hose Nozzle** - hose end that attaches to the convective warming blanket

**Snuggle Warm® Convective Warming Blankets**

The convective warming blanket consists of two layers of non-woven polypropylene fabric coated with a layer of polyethylene. The layers are bonded together to form a distribution network of air delivery channels. The warm air is distributed around the blanket through the delivery channels and exits the blanket through a specially designed series of perforations in the patient side of the blanket. The distribution of air is designed to minimize temperature differences throughout the blanket. Refer to Appendix A, *Convective Warming Blanket Identification Chart*, for the list of blankets available.

Accessories

The convective warmer is supplied with the following accessories:

- **Sheet Clip Assembly** - secures the hose to bed sheets to keep the convective warming blanket in place
- **Cord Wrap** - keeps the power cord wrapped together

SECTION 3

Important Safety Information

This section covers information for prescribers and guidelines for safe use of the EQUATOR® Convective Warmer.

CONTRAINDICATIONS

- Thermal injury may occur if convective warming therapy is applied to lower extremities during aortic cross-clamping procedures.
- Thermal injury may occur if convective warming therapy is applied to ischemic limbs.

WARNINGS

Death or serious injury may occur to the patient or users if these warnings are not followed:

- These instructions contain important information for safe use of the product. Read the entire contents of this Operator's Manual, including Warnings and Cautions, before using this product. Failure to properly follow warnings, cautions and instructions could result in death or serious injury to the patient.
- Electrocuting Hazard. There are no user-serviceable parts inside the enclosure. Only competent personnel knowledgeable in the safety procedures required for servicing live primary MAINS parts shall be allowed to open the enclosure.
- Grounding reliability can only be achieved when the MAINS power cord is connected to a properly grounded receptacle. Risk of electrical shock exists if the equipment is not connected to a properly grounded receptacle.
- Exposed conductor on the MAINS power cord can cause an electrocution hazard. Remove the device from service if the MAINS power cord has exposed wires.
- The convective warmer meets the international electrical interference requirements of EN 60601-1-2. MRI, Portable and mobile RF communications equipment, and other such devices can affect the convective warmer.
- Do not operate the convective warmer in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide. The risk of explosion exists if the device is operated in a potentially explosive environment.

continued

WARNINGS (continued)

- To prevent fire hazard and possible damage to the convective warmer, use only fuses specified. Only competent personnel knowledgeable in the safety procedures required for servicing live primary MAINS parts shall be allowed to open the enclosure.
- Ensure that the convective warmer IV pole mounting clamp is properly tightened before each use. Failure to securely mount the convective warmer onto the I.V. pole may cause it to slide down the I.V. pole, and injure the patient or user.
- Do not mount the convective warmer higher than 117cm (46") on the IV pole. For convenience, 117cm (46") is indicated by a black mark on the power cord. Mounting the convective warmer above 117cm (46") may result in instability of the pole and cause tipping that may injure the patient or user.
- Do not change the air filter while the convective warmer is operating. Risk of thermal injury exists if the device is operating.
- This device can only be used in conjunction with a Snuggle Warm® convective warming blanket. For the safe operation of this device, the user must follow all warnings, cautions, and instructions provided in the Instructions for Use supplied with the compatible convective warming blanket, in addition to this Operator's Manual.
- Convective warming blankets can only be used in conjunction with the EQUATOR® convective warmer (EQ-5000) and the Snuggle Warm® convective warmer (SW-4000). For the safe operation of the blankets, the user must follow all warnings, cautions, and instructions provided in the Instructions for Use supplied with the compatible convective warmer, in addition to this Operator's Manual.
- Always start therapy on the lowest non-ambient temperature setting to prevent thermal injury. Increase the temperature setting, if required, using core body temperature and cutaneous response of skin in contact with the convective warming blanket as indicators.
- To prevent thermal injury, do not use the highest temperature setting when treating patients who have decreased sensation, are nonsensate, or have poor perfusion.
- Monitor patient's body core temperature, vital signs, and observe cutaneous response at regular intervals to prevent thermal injury. If erythema or instability in vital signs is evident, decrease the temperature setting or discontinue use of convective warming therapy.
- To prevent thermal injury in hypotensive or hypoperfused patients, observe cutaneous response more frequently. Reduce the temperature setting or discontinue use of convective warming therapy if instability in vital signs or erythema occurs.
- If the patient's nose or mouth is positioned against the convective warming blanket or the plastic drape, closely monitor the patient's breathing to prevent suffocation injury.

continued

WARNINGS (continued)

- Cover all open wounds in contact with the convective warming blanket to prevent airborne contamination.
- The hose nozzle **MUST** be connected to a Snuggle Warm[®] convective warming blanket. Do not treat patients with the hose alone. Thermal injury may occur.
- Use only one convective warmer and one hose. Use of multiple convective warmers in multiple inlet ports of the same convective warming blanket may cause damage to the blanket and thermal injury to the patient.
- To prevent thermal injury, do not allow any of the patient's body parts to rest on the active hose inlet.
- Do not place objects onto the convective warming blanket that will obstruct air flow. Items on the blanket can produce localized pressure on the patient's skin, reducing cutaneous blood flow and causing thermal injury to the patient
- For underbody blankets do not place objects, other than the patient's body, onto the convective warming blanket that will obstruct air flow. Items on the blanket can produce localized pressure on the patient's skin, reducing cutaneous blood flow and causing thermal injury to the patient.
- For the SW-2013 Adult Underbody Convective Warming Blanket, always keep the arms at the patient's side. Do not allow the patient's arms to extend outside the blanket as they may obstruct airflow through the blanket. Airflow obstruction may result in insufficient patient warming and loss of therapy.
- When replacing the hose, always disconnect the thermistor cable attached to the old hose. Be sure to attach the hose and thermistor cable from the new hose, prior to using the device. Never allow the use of two hoses where one hose is inserted in the air outlet of the device while the thermistor cable from another hose is connected to the device. Failure to replace the hose without replacing the associated thermistor cable may result in an uncontrolled temperature that may cause a serious burn to the patient.
- Always place the perforated side of the convective warming blanket, the side with small holes, towards the patient. Failure to do so may result in thermal injury.
- Do not use a convective warming blanket over transdermal medications as this may lead to increased drug delivery that may result in patient injury or death.
- The convective warming blanket is for single-use only. Reusing the blanket may increase the risk of cross contamination.
- Use with the EQUATOR[®] convective warmer (EQ-5000) and the Snuggle Warm[®] convective warmer (SW-4000). Using non-compatible convective warmers may cause damage to the convective warming blanket and thermal injury to the patient.

continued

WARNINGS (continued)

- Do not sterilize convective warming blankets. Sterilizing blankets may damage the blanket and may cause thermal injury to the patient.
- If Over Temperature audible alarm sounds and/or red Over Temperature alarm indicator illuminates, discontinue use of the convective warmer to prevent thermal injury to the patient. Remove the device from service. Contact Smiths Medical or your local Smiths Medical distributor.
- If the convective warmer does not perform its self-test properly, fails to operate, or stops while running, discontinue use of the convective warmer to prevent thermal injury to the patient. Remove the device from service. Contact Smiths Medical or your local Smiths Medical distributor.
- The convective warmer must be calibrated by competent personnel authorized by Smiths Medical. Failure to calibrate the device correctly may result in thermal injury to the patient.
- Do not use the SW-2008 convective warming blanket if the package is damaged or open. Sterility may be compromised.

CAUTIONS

Malfunction, failure, or damage to the device may occur if these cautions are not followed:

- Do not use alcohol or other strong solvents to clean the hose or exterior surfaces. These solutions may damage labels and other parts.
 - Never use organic solvents (e.g., acetone), strong acids, or bases to clean any portion of the convective warmer.
 - Do not place the convective warmer directly under a faucet or use a faucet sprayer to rinse. Never spray cleaning or other fluids into openings on the convective warmer or into the external connectors.
 - Medical devices require specific material characteristics to perform as intended. These characteristics have been verified for single use only. Any attempt to re-process the device for subsequent re-use may adversely affect the integrity of the device or lead to deterioration in performance.
 - Federal (U.S.A.) law restricts this device to sale by or on the order of a physician.
-

SECTION 4

Assembly Instructions

The EQUATOR[®] Convective Warmer must be assembled and tested by authorized Smiths Medical personnel, an authorized distributor of Smiths Medical, or competent personnel prior to placing the convective warmer in service. Read through the instructions completely prior to assembling the convective warmer.

The following steps describe how to assemble and do preliminary set up of the convective warmer.

Step 1: Unpack the Convective Warmer

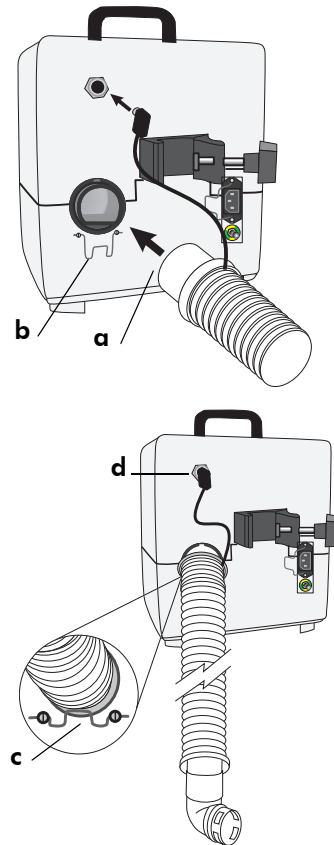
- 1 Check the contents and verify that all components are present. If any parts are missing or damaged, do not use the convective warmer. Contact Smiths Medical for replacement parts. Refer to the following list of components that are part of the convective warmer:

- EQUATOR[®] Convective Warmer
- Operator's Manual
- Power Cord
- Hose
- Sheet Clip Assembly
- Cord Wrap

Note: After unpacking all the contents, recycle packaging material according to hospital policy for recyclable materials.

Step 2: Attach the Hose to the Convective Warmer

- 1 Attach the hose (**a**) to the air outlet. Push the hose firmly into the outlet.
- 2 Move the retainer clip (**b**) next to the hose. Then lift the clip up over the lip of the hose connector (**c**) to secure the hose to the air outlet.
- 3 Connect the thermistor cable from the hose to the thermistor receptacle (**d**). Align the three prongs in the thermistor with the three holes in the receptacle, then turn the knurled knob clockwise on the thermistor to secure it in the receptacle.

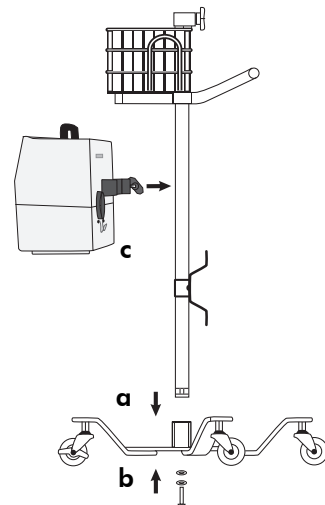


Step 3: Install the Convective Warmer

The convective warmer can be placed on a flat hard surface, mounted to an I.V. pole, or mounted to the EQUATOR® Convective Warmer cart.

Assemble the Convective Warmer Cart

- 1 Place the pole (**a**) on the wheels.
- 2 Insert washers (2) and bolt (**b**) and tighten.
- 3 Place the convective warmer (**c**) on the pole and turn the clamp to tighten.
- 4 Check the tightness of the convective warmer to ensure it is securely clamped to the pole.



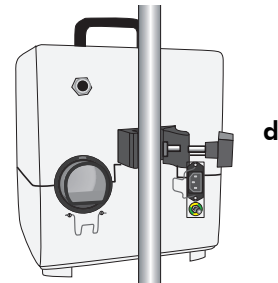
WARNINGS

- Do not mount the convective warmer higher than 117cm (46") on the IV pole. For convenience, 117cm (46") is indicated by a black mark on the power cord. Mounting the convective warmer above 117cm (46") may result in instability of the pole and cause tipping that may injure the patient or user.
- Ensure that the convective warmer I.V. pole mounting clamp is properly tightened before each use. Failure to securely mount the convective warmer onto the I.V. pole may cause it to slide down the I.V. pole, and injure the patient or user.

Mount to an I.V. Pole

Note: Do not place the convective warmer higher than 117cm (46") from the floor.

- 1 Place the convective warmer, on the pole and turn the clamp (d) to tighten.
- 2 Check the tightness of the Convective Warmer to ensure it is securely clamped to the pole.

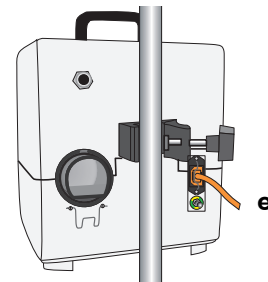


WARNINGS

- Grounding reliability can only be achieved when the MAINS power cord is connected to a properly grounded receptacle. Risk of electrical shock exists if the equipment is not connected to a properly grounded receptacle resulting in death or serious injury to the patient or user.

Install the Power Cord

- 1 Insert the plug on the power cord (e) into the power cord receptacle on the rear of the convective warmer.
- 2 Push the power cord lock over the plug to secure it in the receptacle.



Step 4: Perform Electrical Safety Tests

Perform all applicable electrical safety tests as required per institutional procedure. Electrical safety check must be performed by competent personnel authorized by the institution to perform such testing. These tests include, but are not limited to: leakage current, ground bond test, and hypot. Refer to the *EQUATOR® Convective Warmer Service Manual* (PN 4533902-GB) for further information about electrical safety testing. Perform electrical safety checks on a routine basis according to institutional policy.

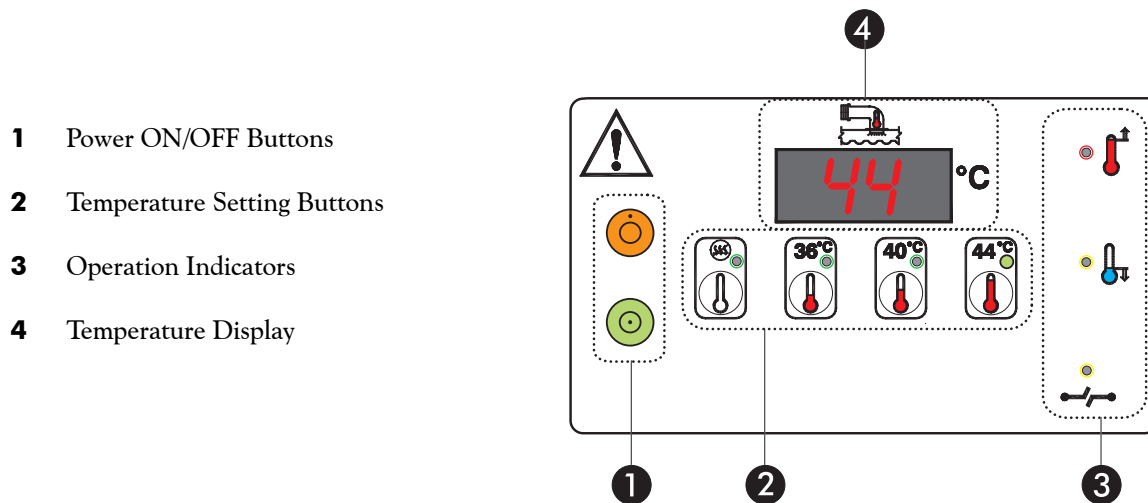
SECTION 5

Operation

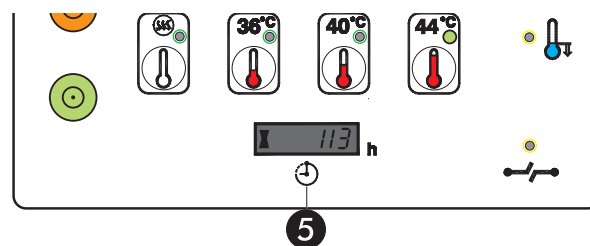
Operation of the EQUATOR[®] Convective Warmer is monitored and controlled by the control panel. This section describes the control panel and the modes of operation.

Control Panel

The Control Panel provides the following controls, indicators, and displays used during operation of the convective warmer.



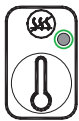
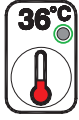
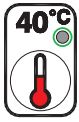




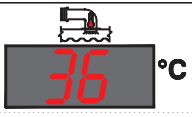


On some convective warmers the control panel may contain the Elapsed Time Display (**5**). This function displays in hours (h = hours) the cumulative time use of the convective warmer.



Controls, Indicators, and Displays

The following table defines each control, indicator, and display and the modes of operation.

Control/Indicator	Definition
	Power ON Button The green button powers ON the convective warmer.
	Power OFF Button The orange button powers OFF operating components of the convective warmer. Note: To remove all power from the convective warmer, the MAINS power cord must be removed from the electrical receptacle.
	Ambient Air Temperature Setting Button When selected, the heater is turned off and the motor still operates (air flows).
	36°C Temperature Setting Button When selected, the air temperature is set to 36°C at the hose end.
	40°C Temperature Setting Button When selected, the air temperature is set to 40°C at the hose end.
	44°C Temperature Setting Button When selected, the air temperature is set to 44°C at the hose end.
	Over Temperature Alarm Indicator If the hose end temperature is more than 3°C ($\pm 1^\circ\text{C}$) above the selected temperature, the indicator illuminates, a continuous audible alarm sounds, and the heater and motor shut off.
	Under Temperature Indicator If the hose end temperature is more than 3°C ($\pm 1^\circ\text{C}$) below the selected temperature, this indicator flashes.
	Disconnect Indicator If the thermistor cable or the hose is not attached properly, this indicator illuminates, an audible alarm sounds and repeats approximately every five seconds, and the heater and motor shut off. If the heater has an open wire circuit, this indicator illuminates, an audible alarm sounds and repeats approximately every five seconds, the heater shuts off, but the motor continues to operate (air flows).
	Hose End Temperature Display Displays the temperature of the air at the hose end.

SECTION 6

Operating Instructions

The Operating Instructions for the EQUATOR® Convective Warmer are grouped into seven segments. Read through each segment before performing a procedure.

Step 1: Set Up for Use

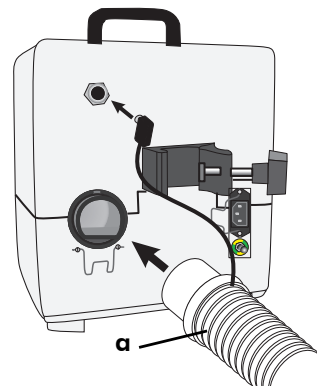
WARNINGS

- When replacing the hose, always disconnect the thermistor cable attached to the old hose. Be sure to attach the hose and thermistor cable from the new hose, prior to using the device. Never allow the use of two hoses where one hose is inserted in the air outlet of the device while the thermistor cable from another hose is connected to the device. Failure to replace the hose without replacing the associated thermistor cable may result in an uncontrolled temperature that may cause a serious burn to the patient.

- 1 Verify that the correct hose, either SW5-HOSE7 (a) or SW5-HOSE-N (b), is attached to the convective warmer. Refer to Section 4, *Assembly Instructions*, for the procedure to install the hose.

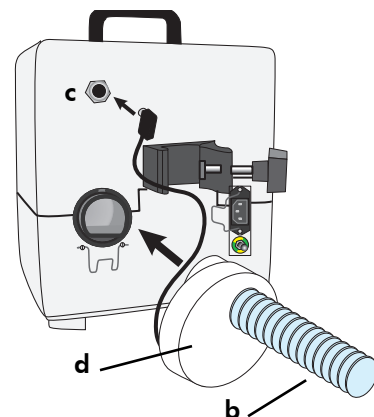
Note: When replacing the hose, always remove the thermistor cable with the hose. Never replace the hose without replacing the thermistor cable.

Refer to Appendix A, *Convective Warming Blanket Identification Chart*, for a list of convective warming blankets and the appropriate hose.



- 2 Verify that the hose thermistor cable is connected to the thermistor receptacle (c) on the convective warmer.

Note: When using the blue Neonatal hose with the black connector (SW5-HOSE-N), orient the white shield (d) to the left. Do not use the hose retainer clip with this hose.



Step 2: Determine the Convective Warming Blanket Size

WARNINGS

- The convective warming blanket is for single-use only. Reusing the blanket may increase the risk of cross contamination.
 - Cover all open wounds in contact with the convective warming blanket to prevent airborne contamination.
 - Use with the EQUATOR® convective warmer (EQ-5000) and the Snuggle Warm® convective warmer (SW-4000). Using non-compatible convective warmers may cause damage to the convective warming blanket and thermal injury to the patient.
-

Determine which convective warming blanket is appropriate for the patient. Refer to Appendix A, *Convective Warming Blanket Identification Chart* for a description and dimensions of the convective warming blankets that are available.

Do not use the convective warming blanket if the package has been opened or is damaged. Do not sterilize blankets.

Product meets Consumer Products Safety Commission's flammable fabric regulation, 16 CFR 1610; however, follow standard safety protocols when using high-intensity heat sources.

Step 3: Position the Convective Warming Blanket

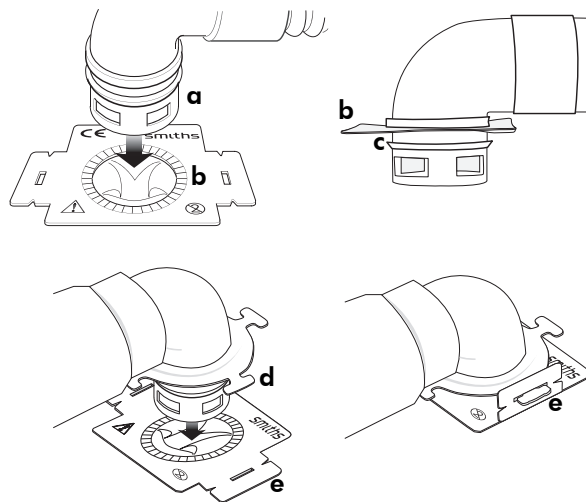
Appendix B, *Position the Convective Warming Blanket*, describes how to position the convective warming blanket. Refer to Appendix B for the procedure to position the specific convective warming blanket being used.

Step 4: Attach the Hose to Convective Warming Blanket

WARNINGS

- The hose nozzle **MUST** be connected to a Snuggle Warm® convective warming blanket. Do not treat patients with the hose alone. Thermal injury may occur.

- 1 Insert the hose nozzle (a) into the collar ring (b).
- 2 Ensure the hose barb (c) snaps into the collar ring (b).
- 3 If the hose has locking tabs (d), secure the hose to the convective warming blanket using the hose retainer wings (e). The hose tabs will protrude through the retainer wings (e).



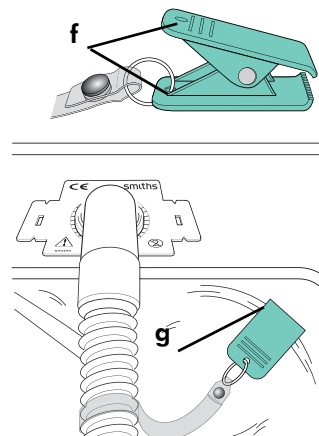
Step 5: Attach the Sheet Clip to the Sheet Under the Patient

Two types of sheet clips are available. Use the method appropriate for your clip.

Attaching the New Style Sheet Clip

- 1 Squeeze the handles (f) on the sheet clip to open the jaws-like opening.
- 2 Insert the sheet into the open jaws (g) and release the handles to lock in place.

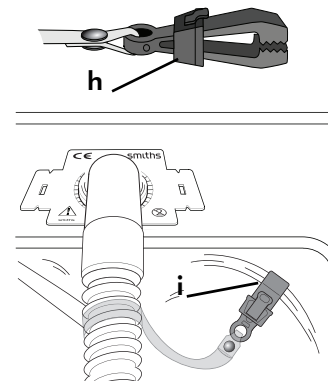
Note: Proper attachment of the sheet clip to the sheet under the patient is essential to the proper function of the sheet clip assembly. The weight of the patient on the sheet helps hold the hose in place when the sheet clip is used.



Attaching the Older Style Sheet Clip

- 1 Slide the sheet clip lock (h) away from the jaws-like opening.
- 2 Insert the sheet into the open jaws (i) and slide the sheet clip lock towards the opening until it clicks and locks in place.

Note: Proper attachment of the sheet clip to the sheet under the patient is essential to the proper function of the sheet clip assembly. The weight of the patient on the sheet helps hold the hose in place when the sheet clip is used.

**Step 6: Using the Convective Warmer****CONTRAINDICATIONS**

- Thermal injury may occur if convective warming therapy is applied to lower extremities during aortic cross-clamping procedures.
- Thermal injury may occur if convective warming therapy is applied to ischemic limbs.

WARNINGS

- Grounding reliability can only be achieved when the MAINS power cord is connected to a properly grounded receptacle. Risk of electrical shock exists if the equipment is not connected to a properly grounded receptacle resulting in death or serious injury to the patient or user.
- Exposed conductor on the MAINS power cord can cause an electrocution hazard. Remove the device from service if the MAINS power cord has exposed wires.
- Do not operate the Convective Warmer in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide. The risk of explosion exists if the device is operated in a potentially explosive environment.
- Always start therapy on the lowest non-ambient temperature setting to prevent thermal injury. Increase the temperature setting, if required, using core body temperature and cutaneous response of skin in contact with the convective warming blanket as indicators.
- To prevent thermal injury, do not use the highest temperature setting when treating patients who have decreased sensation, are nonsensate, or have poor perfusion.
- Monitor patient's body core temperature, vital signs, and observe cutaneous response at regular intervals to prevent thermal injury. If erythema or instability in vital signs is evident, decrease the temperature setting or discontinue use of convective warming therapy.

continued

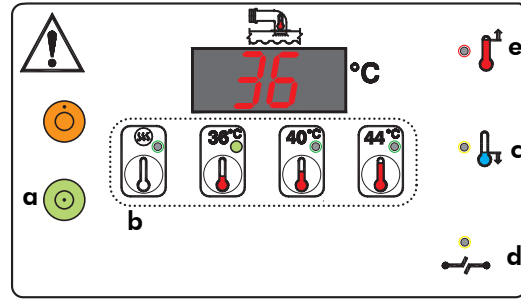
WARNINGS (continued)

- To prevent thermal injury in hypotensive or hypoperfused patients, observe cutaneous response more frequently. Reduce the temperature setting or discontinue use of convective warming therapy if instability in vital signs or erythema occurs.
- If Over Temperature audible alarm sounds and/or red Over Temperature alarm indicator illuminates, discontinue use of the convective warmer to prevent thermal injury to the patient. Remove the device from service. Contact Smiths Medical or your local Smiths Medical distributor.
- If the convective warmer does not perform its self-test properly, fails to operate, or stops while running, discontinue use of the convective warmer to prevent thermal injury to the patient. Remove the device from service. Contact Smiths Medical or your local Smiths Medical distributor.
- Do not place objects onto the convective warming blanket that will obstruct air flow. Items on the blanket can produce localized pressure on the patient's skin, reducing cutaneous blood flow and causing thermal injury to the patient.
- For underbody blankets do not place objects, other than the patient's body, onto the convective warming blanket that will obstruct air flow. Items on the blanket can produce localized pressure on the patient's skin, reducing cutaneous blood flow and causing thermal injury to the patient.
- To prevent thermal injury, do not allow any of the patient's body parts to rest on the active hose inlet.
- Use only one convective warmer and one hose. Use of multiple convective warmers in multiple inlet ports of the same convective warming blanket may cause damage to the blanket and thermal injury to the patient.
- Always place the perforated side of the convective warming blanket, the side with small holes, towards the patient. Failure to do so may result in thermal injury.
- Do not use a convective warming blanket over transdermal medications as this may lead to increased drug delivery that may result in patient injury or death.

-
- 1** Plug the power cord into a properly grounded **MAINS** receptacle.
 - 2** Press and release the green Power ON button (a) to turn the convective warmer ON. The convective warmer performs its self-test.

3 Verify that the self-test completes in the following order:

- The indicators for Ambient Air, 36°C, 40°C, 44°C (**b**), and Under Temperature (**c**) light up at the same time.
- The Disconnect indicator (**d**) flashes three times.
- The Over Temperature indicator (**e**) flashes and an audible beep sounds, indicating the ending of the self-test.



4 Press the 36°C Temperature Setting during or after the self-test. The temperature setting may be increased as tolerated by the patient.

Note: If no temperature setting is selected, the device will blow ambient air until a temperature is selected.

5 Monitor the patient's temperature and vital signs continuously. Visually examine the heated skin surface at regular intervals. Adjust the temperature setting or discontinue therapy as required.

Step 7: After Use

1 Press and release the orange Power OFF button (**f**) to turn the convective warmer off.

2 Remove the hose from the convective warming blanket.



Note: Dispose of the convective warming blankets in a safe manner according to local guidelines for disposal of contaminated medical waste.

3 Perform routine cleaning after each use. Refer to Section 8, *Maintenance*, for more details.

4 Coil the power cord, wrap the cord wrap around the coiled power cord, and snap closed.

Storage

Store the convective warmer in a cool, dry place away from temperature extremes. Refer to Section 12, *Specifications*, for more details.

SECTION 7

Troubleshooting

If the suggested solutions do not correct the problem, discontinue use of the EQUATOR® Convective Warmer and remove from service. Contact Smiths Medical or your local Smiths Medical distributor.

Problem	Possible Cause/Solution
The convective warmer does not start when the ON button is pressed	<ol style="list-style-type: none"> The convective warmer is not plugged in. <ul style="list-style-type: none"> Check that the power cord is plugged into the rear of the convective warmer and into a working electrical receptacle. Power cord is defective or cut. <ul style="list-style-type: none"> Inspect the power cord and replace if necessary.
The convective warmer does not complete self-test	<ol style="list-style-type: none"> The thermistor cable may be disconnected or not fully inserted. <ul style="list-style-type: none"> Check the thermistor cable connection. The hose may not be fully inserted into the air outlet. <ul style="list-style-type: none"> Push the hose firmly to secure it in the outlet. Ensure the hose retainer clip is properly attached The hose has a malfunction. <ul style="list-style-type: none"> Replace the hose.
No air flow	<p>The hose and/or the thermistor cable may not be properly connected.</p> <ul style="list-style-type: none"> Check the hose and thermistor cable connections.
Weak air flow	<p>Clogged air filter or obstructed air filter intake.</p> <ul style="list-style-type: none"> Check the air filter intake for an obstruction and remove. Check the air filter for clogging or obstructions and replace if necessary.
Air flow is too strong and the convective warmer is noisy	<p>Defective air filter or the air filter is not properly installed.</p> <ul style="list-style-type: none"> Check the air filter for proper installation. Replace if defective.
No heat, but the motor is turned on and air is flowing	<ol style="list-style-type: none"> Ambient air button is selected. <ul style="list-style-type: none"> Select desired temperature.
The Disconnect indicator illuminates, the motor is operating, air is flowing but is no longer heated	<p>A blockage in the blanket or an object on the blanket is preventing air from flowing freely through the blanket.</p> <ol style="list-style-type: none"> Check the blanket for anything blocking airflow, such as an unfolded blanket, tight drawstrings around the blanket, drapes on the blanket. Correct the condition until the blanket fills with air. Press the Ambient Air Temperature Setting button, then press a Temperature Setting button. If the condition continues, remove the convective warmer from service. Contact Smiths Medical or your local Smiths Medical distributor.
Over Temperature indicator illuminates	<p>The temperature at the hose end is above the temperature selected on the control panel.</p> <ul style="list-style-type: none"> Turn the power off and then turn it on again. If the condition persists, discontinue use of the convective warmer and remove it from service.
	continued

Problem	Possible Cause/Solution
Under Temperature indicator illuminates	<p>The temperature at the hose end is below the temperature selected on the control panel.</p> <ul style="list-style-type: none"> Wait until the air temperature reaches the selected temperature.
The Disconnect indicator illuminates and the heater and motor have stopped operating	<p>The hose and/or the thermistor cable are not properly connected.</p> <ol style="list-style-type: none"> Check the hose and thermistor cable connections. <p>Note: When the cable is disconnected, zeros (00) appear in the display. When the hose is disconnected, the temperature still appears in the display.</p> If they are connected correctly and the condition continues, remove the convective warmer from service. Contact Smiths Medical or your local Smiths Medical distributor.
Electromagnetic interference to other devices	<p>This equipment has been tested and found to comply with the limits for medical devices to IEC 601-1-2/EN 60601-1-2. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instructions, it may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:</p> <ul style="list-style-type: none"> Reorient or relocate the receiving device. Increase the separation between the equipment. Connect the equipment to an outlet on a circuit different from that to which the other device(s) is (are) connected. Consult the manufacturer or field service technician for help. <p>If placed near monitoring equipment, or other electronic devices, this equipment must be IEC 601-1-2/EN 60601-1-2 approved or electromagnetic interference may result.</p>

SECTION 8

Maintenance

Only competent personnel should perform any routine maintenance and repairs to the EQUATOR® Convective Warmer.

Clean the Convective Warmer and Hose

Clean the enclosure and hose after every use.

CAUTIONS

- Do not use alcohol or other strong solvents to clean the hose or exterior surfaces. These solutions may damage labels and other parts.
- Never use organic solvents (e.g., acetone), strong acids, or bases to clean any portion of the convective warmer.
- Do not place the convective warmer directly under a faucet or use a faucet sprayer to rinse. Never spray cleaning or other fluids into openings on the convective warmer or into the external connectors.

-
- 1 Disconnect the MAINS power cord from the electrical receptacle and from the rear of the convective warmer.
 - 2 Visually inspect the convective warmer to ensure there is no visible damage or deterioration of the enclosure such as cracks, or deterioration of the labels and power cord. Do not clean if there is a defect. Contact Smiths Medical or your local Smiths Medical distributor.
 - 3 Immerse a soft cloth or sponge as an applicator into the cleaning solution consisting of mild liquid detergent soap and warm tap water mixture. Squeeze out excess solution so that the applicator is not dripping. Wipe or scrub the entire surface of the enclosure and control panel. Use a soft brush to clean the power cord if necessary.
 - 4 Rinse a separate soft cloth or sponge in room temperature running potable water. Squeeze out excess water so that the applicator is not dripping. Wipe all of the aforementioned surfaces. Repeat rinsing the cloth or sponge several times with fresh running water during this process to insure all visible residue is removed.
 - 5 Dry the item with a hand towel or soft cloth.
 - 6 Visually inspect the convective warmer and its components to insure that they have been thoroughly cleaned. Repeat cleaning procedure if necessary.

- 7 After thoroughly cleaning the convective warmer, perform disinfection if required.
- 8 If it is hospital policy to perform disinfection as part of reprocessing, then follow your institution's guidelines for disinfecting of the surfaces of non-critical medical devices. The list below includes low-level disinfectants that are commonly used in the medical community and high-level disinfectants that are claimed by the manufacturer. The effectiveness of these listed disinfectants should be validated using the hospital procedures.

The following disinfectant agents can be used without causing damage to the enclosure:

Low Level Disinfectants:

- fantastik[®] All Purpose Cleaner

High Level Disinfectants:

- 1.56% Phenol (e.g., Sporidicin[®])
- 3.4% Glutaraldehyde (e.g., CIDEX[®] Plus)
- 10% Bleach solution
- 1% Ammonia solution
- Surface disinfectants compatible with plastic or metal materials.

- 9 Rinsing of the disinfectant residue should be done using a soft cloth or sponge as the applicator.

Replace the Air Filter (F3-5000)

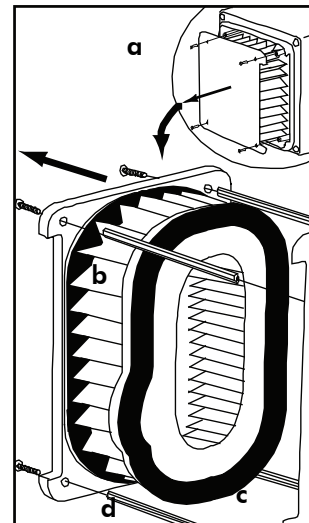
Replace the air filter every 12 months, or sooner if required.

Note: Always perform functional tests after replacing the air filter.

WARNINGS

- Do not change the air filter while the convective warmer is operating. Risk of thermal injury exists if the device is operating.
-

- 1 Disconnect the MAINS power cord from both the electrical receptacle and from the rear of the convective warmer.
- 2 Remove the convective warmer from the pole, if pole mounted, and lay it on its side (a).
- 3 Remove the four small Phillips-head screws on the bottom securing the filter in place.
- 4 Discard the old filter assembly [filter (b) and gasket (c)].
- 5 Remove and discard the four standoffs (d).
- 6 Install the four replacement standoffs.
- 7 Inspect the new filter gasket to be sure it is clean and unmarked.
- 8 Inspect the filter-mating surface to be sure it is clean.
- 9 Install the new filter assembly using the original screws.









Functional Tests


Perform functional tests after replacing the air filter or opening the convective warmer enclosure. Perform all 9 functional tests in the order they are presented in the following pages. Be sure to read through each test to obtain an understanding of the steps involved in each individual procedure before starting.

Note: When performing any forced over temperature check, always start with the device turned OFF.












Test 1: Self-Test Sequence

The self-test sequence checks that the automatic self-test functions properly when the device is turned ON.

- 1 Press the ON button  and allow the device to complete its self-test sequence.
- 2 During the self-test sequence, check the control panel to verify that all of the push-button Light Emitting Diodes (LEDs) and the Under Temperature LED () are lit, and at the same time that the following sequence occurs:
 - Temperature Thermistor Open Circuit check OK = Flash  .
 - Safety Thermistor Open Circuit check OK = Flash  .
 - Open Heater Detector Circuit check OK = Flash  .
 - Safety Thermistor Over Temperature check OK = Flash  and BEEP.


- 3 Check that all the LEDs turn off, except the Ambient button  LED, and that the motor continues to run.
- 4 The self-test is completed. If the self-test sequence did not complete properly, refer to the *EQUATOR® Convective Warmer Service Manual*.

Test 2: Disconnect Indicator Test


- 1 If necessary, press the OFF button , then press the ON button . Wait for the self-test to complete.
- 2 Disconnect the hose thermistor cable from the rear of the device. Verify that the Disconnect LED () lights, the alarm beeps, and the motor stops.
- 3 Press the OFF button  and then press the ON button . The self-test should stop on the first test.
- 4 Reconnect the thermistor cable. The self-test should continue to completion.
- 5 Disconnect the hose from the rear of the device. Verify that the Disconnect LED () lights, the alarm beeps, and the motor stops.
- 6 Reconnect the hose. Verify that the Disconnect LED () turns off and the device continues to run.
- 7 Press the High button . Wait for the temperature to rise to approximately 30°C.
- 8 Disconnect the hose from the rear of the device. Verify that the Disconnect LED () lights, the alarm beeps, and the motor stops.
- 9 Reconnect the hose. Verify that the Disconnect LED () turns off, the motor restarts, and the temperature continues to increase toward 44°C.
- 10 Press the Ambient button .

Test 3: High (44°C) Temperature Test


This test verifies the High temperature readings.

- 1 Press the High button  and allow the temperature to stabilize for at least 5 minute.
- 2 After the temperature has stabilized, verify that the High temperature readings appear as 44°C.






Test 4: Medium (40°C) Temperature Test

- 1 Press the Medium button , and allow the temperature to stabilize for at least 5 minutes.
- 2 After the temperature has stabilized, verify that the Medium temperature readings appear as 40°C.






Test 5: Low (36°C) Temperature Test

- 1 Press the Low button , and allow the temperature to stabilize for at least 5 minutes.
- 2 After the temperature has stabilized, verify that the Low temperature readings appear as 36°C.



Test 6: Low (36°C) Over Temperature and Under Temperature Test




- 1 Press the OFF button  and then press the ON button . The device will restart and proceed through the self-test sequence.
- 2 If the device is hot, let it cool to approximately 30°C before proceeding.
- 3 Press and hold the LOW button  on the front panel for approximately 8 seconds, until the Low button LED starts to flash.
- 4 As the temperature increases, verify that the following events occur:
 - Between 32°C and 34°C, the Under Temperature LED () stops flashing.
 - Between 38°C and 40°C, the Over Temperature alarm sounds, the Over Temperature LED () lights, the motor stops, and the control panel displays the temperature at which the Over Temperature alarm was activated.

Test 7: Medium (40°C) Over Temperature and Under Temperature Test






- 1 Press the OFF button  and then press the ON button . The device will restart and proceed through the self-test sequence.
- 2 If the device is hot, let it cool to approximately 35°C before proceeding.
- 3 Press and hold the Medium button  on the control panel for approximately 8 seconds, until the Medium button LED starts to flash.
- 4 As the temperature increases, verify that the following events occur:
 - Between 36°C and 38°C, the Under Temperature LED () stops flashing.
 - Between 42°C and 44°C, the Over Temperature alarm sounds, the Over Temperature LED () lights, the motor stops, and the control panel displays the temperature at which the Over Temperature alarm was activated.

Test 8: High (44°C) Over Temperature and Under Temperature Test

- 1 Press the OFF button  and then press the ON button . The device will restart and proceed through the self-test sequence.
- 2 If the device is hot, let it cool to approximately 40°C before proceeding.

- 3 Press and hold the High button  on the control panel for approximately 8 seconds, until the High button LED starts to flash.
- 4 As the temperature increases verify that the following events occur:
 - Between 40°C and 42°C, the Under Temperature LED () stops flashing.
 - Between 46°C and 48°C, the Over Temperature alarm sounds, the Over Temperature LED () lights, the motor stops, and the control panel displays the temperature at which the Over Temperature alarm was activated.

Test 9: Ambient Over Temperature Test

- 1 Press the OFF button  and then press the ON button . The device will restart and proceed through the self-test sequence.
- 2 If the device is hot, let it cool to approximately 44°C before proceeding.
- 3 Press and hold the Ambient button  on the control panel until the Ambient button LED starts to flash.
- 4 As the temperature increases, verify that the following events occur:
 - Between 46°C and 48°C, the Over Temperature alarm sounds, the Over Temperature LED () lights, the motor stops, and the control panel displays the temperature at which the Over Temperature alarm was activated.
- 5 Press the OFF button .

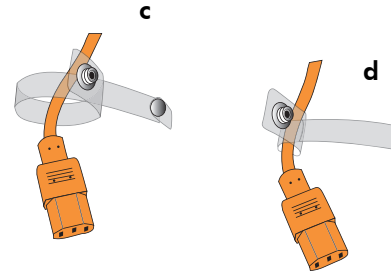
SECTION 9

Accessories

This section contains procedures to install and replace the cord wrap and the sheet clip.

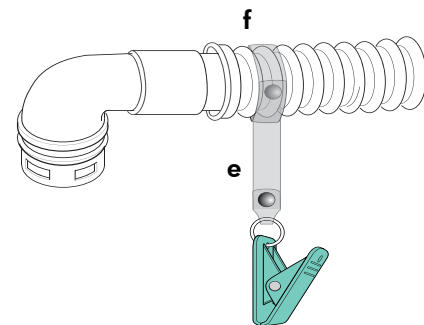
Cord Wrap (CW-5000)

- 1 Disconnect the MAINS power cord from both the electrical receptacle and from the rear of the convective warmer.
- 2 Slip the cord wrap over the end of the power cord (c) that plugs into the convective warmer.
- 3 Pull the cord wrap tightly (d).

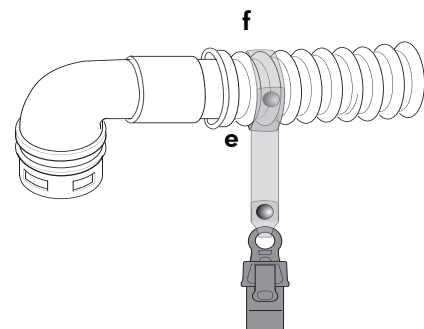


Sheet Clip (SC-5000)

- 1 Wrap the plastic strap of the sheet clip (e) around the hose near the hose nozzle.
- 2 Close the snap (f) to secure the sheet clip to the hose.



New style sheet clip



Older style sheet clip

SECTION 10

Limited Warranty

Smiths Medical ASD, Inc. (the “Manufacturer”) warrants to the Original Purchaser that the EQUATOR® Convective Warmer (the “Convective Warmer”), not including accessories, shall be free from defects in materials and workmanship under normal use, if used in accordance with this Operator’s Manual, for a period of one year from the actual date of sale to the Original Purchaser. THERE ARE NO OTHER WARRANTIES.

This warranty does not cover normal wear and tear and maintenance items, and specifically excludes hoses, warming blankets, roll stands or any other accessory items or equipment used with the Convective Warmer.

Subject to the conditions of and upon compliance with this Limited Warranty, the Manufacturer will repair or replace at its option without charge (except for a minimal charge for postage and handling) any Convective Warmer (not including accessories) which is defective if a claim is made during such one-year period.

The following conditions, procedures, and limitations apply to the Manufacturer's obligation under this warranty:

- A. **Parties Covered by this Warranty:** This warranty extends only to the Original Purchaser of the Convective Warmer. This warranty does not extend to subsequent purchasers. The Original Purchaser may be medical personnel, a hospital, or institution which purchases Convective Warmers for treatment of patients. The Original Purchaser should retain the invoice or sales receipt as proof as to the actual date of purchase.
- B. **Warranty Performance Procedure:** Notice of the claimed defect must be made in writing or by telephone to the Manufacturer as follows: Customer Service Department, Smiths Medical ASD, Inc., 160 Weymouth Street, Rockland, MA 02370, (800) 258-5361. Notice to the Manufacturer must include date of purchase, model and serial number, and a description of the claimed defect in sufficient detail to allow the Manufacturer to determine and facilitate any repairs which may be necessary. AUTHORIZATION MUST BE OBTAINED PRIOR TO RETURNING THE CONVECTIVE WARMER. If authorized, the Convective Warmer must be properly and carefully packaged and returned to the Manufacturer, postage prepaid. Any loss or damage during shipment is at the risk of the sender.
- C. **Conditions of Warranty:** The warranty is void if the Convective Warmer has been 1) repaired by someone other than the Manufacturer or its authorized agent; 2) altered so that its stability or reliability is affected; 3) misused; or 4) damaged by negligence or accident. Misuse includes, but is not limited to, use not in compliance with the Operator's Manual or use with non-approved accessories. Removal or damage to the Convective Warmer’s serial number will invalidate this warranty.

D. Limitations and Exclusions: Repair or replacement of the Convective Warmer or any component part thereof is the EXCLUSIVE remedy offered by the Manufacturer. The following exclusions and limitations shall apply:

1. No agent, representative, or employee of the Manufacturer has authority to bind the Manufacturer to any representation or warranty, expressed or implied.
2. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS OR USE OF THE CONVECTIVE WARMER FOR ANY PARTICULAR PURPOSE.
3. The Convective Warmer can only be used under the supervision of medical personnel whose skill and judgment determine the suitability of the Convective Warmer for any particular medical treatment.
4. All recommendations, information, and descriptive literature supplied by the Manufacturer or its agents are believed to be accurate and reliable, but do not constitute warranties.

The Manufacturer disclaims responsibility for the suitability of the Convective Warmer for any particular medical treatment or for any medical complications resulting from the use of the Convective Warmer. The Manufacturer shall not be responsible for any incidental damages or consequential damages to property, loss of profits, or loss of use caused by any defect or malfunction of the Convective Warmer.

This warranty gives the Original Purchaser specific legal rights, and the Original Purchaser may have other legal rights which may vary from state to state.

SECTION 11

Service

All service must be performed by Smiths Medical, or competent personnel. Service by any other person or organization voids the warranty and transfers liability for malfunctions of the device to the servicing organization.

WARNINGS

- The convective warmer must be calibrated by competent personnel authorized by Smiths Medical. Failure to calibrate the device correctly may result in thermal injury to the patient.
 - To prevent fire hazard and possible damage to the convective warmer, use only fuses specified. Only competent personnel knowledgeable in the safety procedures required for servicing live primary MAINS parts shall be allowed to open the enclosure.
-

Non-Warranty Work

Devices received that are no longer under warranty can be returned for repair at a cost. The device will be promptly inspected and a verbal estimate of the repair cost will be provided. A purchase order will be required from the original purchaser consistent with the verbal estimate. A written estimate will be provided upon request.

Before returning the EQUATOR[®] Convective Warmer for service, contact Smiths Medical for a Returned Goods Authorization.

Note: The convective warmer must be cleaned and disinfected for repair shipment or it will be immediately returned as received.

Additional Documentation

Upon request Smiths Medical will provide the following documentation:

- Circuit diagrams
- Components parts list(s)
- Description of function
- Service and calibration instructions

Disposal Information

Observe national and local codes or requirements for disposal of contaminated materials and for recycling solid waste materials that may impact the environment.

Service Contacts

Please know the serial number of the convective warmer when you contact the service department. The serial number is located on the rear of the convective warmer. Contact your Smiths Medical Technical Service Department or Smiths Medical distributor at:

USA/Canada

Smiths Medical ASD, Inc.

160 Weymouth Street
Rockland, MA 02370 USA

USA/Canada 1-800-258-5361
International +1-781-878-8011

European Representative

Smiths Medical International Ltd.

1500 Eureka Park, Lower Pemberton,
Ashford, Kent, TN25 4BE, UK

Tel. +44 (0) 1233 722100

Australian Representative

Smiths Medical Australasia Pty. Ltd.

61 Brandl Street,
Eight Mile Plains, QLD 4113, Australia

Tel. +61 (0) 7 3340 1300
Fax +61 (0) 7 3340 1399

New Zealand Tel. 0 800 444 200

www.smiths-medical.com

SECTION 12

Specifications

System Specifications

Standard Compliance	Guidelines	
Product Safety	EN 60601-1, UL 2601-1	
Convective Warming Blanket Flammability	NFPA 702, 16 CFR 1610	
EMC	EN 60601-1-2, FCC 47 CFR Part 15, Class B	
Enclosure Protection	IEC 60529 IP Code: IPX1	
Convective Warmers	ASTM F2196-02	
Drop Test Compliance	EN 60601-1	
Physical	Dimensions	
Height, Overall	30 cm	(11.75 inches)
Width, Overall	24 cm	(9.5 inches)
Depth, Overall	19 cm	(7.5 inches)
Weight, Overall	6.8 Kg	(15 lbs)
Air Flow	8.4 to 12.7m/sec	(1650 to 2500 feet/min)
	1.59 to 2.41 cm/min	(56.2 to 85.2 cf/min)
Filtration System	0.2 micron filter	
Maximum Height on I.V. Pole	117 cm	(46 inches)
Shipping Durability	Vibration and Drop Compliant with ISTA 1A and 2A	
Environmental	Temperature	Humidity
Operation	10°C to 40°C	10 to 95% (non condensing)
Transportation	-18°C to 60°C	5 to 95% (non condensing)
Storage	5°C to 40°C	5 to 95% (non condensing)
Thermal	Temperature	
Hose End Temperature	36° ± 1°C (97°F ± 2°F) 40° ± 1°C (104°F ± 2°F) 44° ± 1°C (111°F ± 2°F)	
Over Temperature Alarm - Forced Air Over Temperature Protection	36°C = 39° ± 1°C (102°F ± 2°F) 40°C = 43° ± 1°C (109°F ± 2°F) 44°C = 47° ± 1°C (117°F ± 2°F)	
Electrical	Type	
Supply Power Input:		
100V	100 VAC, 50/60 Hz, 9.00 Amps	
115V	115 VAC, 50/60 Hz, 8.05 Amps	
230V	230 VAC, 50/60 Hz, 4.0 Amps	
Protection Against Electrical Shock	Class 1 Equipment Type BF	










Electrical	Type				
Mode of Operation	Continuous				
Type of Current	Alternating				
Ingress Protection Rating	IPX1				
Performance					
Relative Average Noise Level at 1000 Hz (front and back)	44.1 dBA				
Hose End Temperature Control	Servo-controlled by thermistors placed at hose end				
The Snuggle Warm® convective warming blankets meet the average and maximum contact surface temperature specified in ASTM F2196.02	<table> <tr> <th>Average</th><th>Maximum</th></tr> <tr> <td>≤46°C</td><td>≤48°C</td></tr> </table>	Average	Maximum	≤46°C	≤48°C
Average	Maximum				
≤46°C	≤48°C				
Approximate time to change the average contact surface temperature from 20°C to 36°C	7 minutes				

















Electromagnetic Environmental Recommendations

Recommended separation distances between portable and mobile RF communications equipment and the EQUATOR® Convective Warmer			
The convective warmer is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the convective warmer can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the convective warmer as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = [3.5/\sqrt{f}] \sqrt{P}$	80 MHz to 800 MHz $d = [3.5/E1] \sqrt{P}$	800 MHz to 2.5 GHz $d = [7/E1] \sqrt{P}$
0.01	0.116	0.116	0.233
0.1	0.368	0.368	0.737
1	1.16	1.16	2.33
10	3.69	3.69	7.38
100	11.66	11.66	23.33
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

SECTION 13

Symbols

Symbols	Definitions
	Power ON Button.
	Power OFF Button.
	Ambient Temperature Setting Button
	36°C Temperature Setting Button
	40°C Temperature Setting Button
	44°C Temperature Setting Button
	Over Temperature Alarm Indicator
	Under Temperature Alarm Indicator
	Disconnect Indicator
	Hose End Temperature
	Elapsed Time Display (h = hours)
	Type BF Equipment
IPX1	Protected Against Dripping Water

Symbols	Definitions
	Catalog Number
	Serial Number
	Part Number
	Batch Code
	Authorized Representative in the European Community
	Manufacturer
	Date of Manufacture
	Quantity
	Protective Earth [Ground]
	Alternating Current
	Do Not Reuse
	Attention , see instructions for use
	Caution
	Consult instructions for use
	Electric Shock Hazard
	Latex Free

Symbols	Definitions
Rx ONLY	Federal (U.S.A.) law restricts this device to sale by or on the order of a physician.
CLASS 1	Device is class type 1 equipment
	No free hosing
	Non-sterile
	Protective earth terminal
	Do not use if package is damaged.
STERILE EO	Sterilized using ethylene oxide
	Temperature Limitation
	Humidity Limitation
	Use by
	Recyclable Product
	Device has been tested by National Technical Systems, a nationally recognized technical laboratory, to meet U.S. requirements for safety.
	Collect separately for electrical and electronic equipment.
CE 0473	CE Mark and Notified Body number (0473 indicates AMTAC)

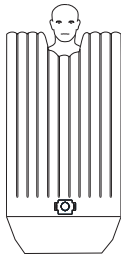
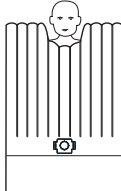
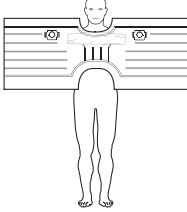
APPENDIX A

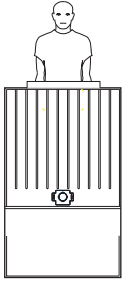
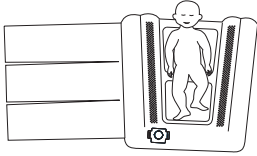
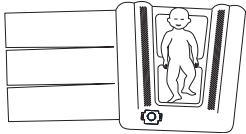
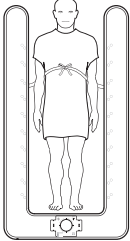
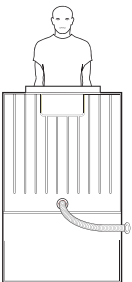
Convective Warming Blanket Identification Chart

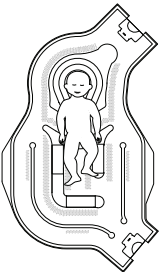
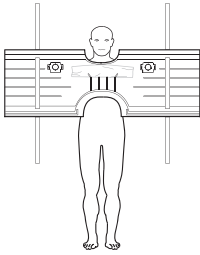
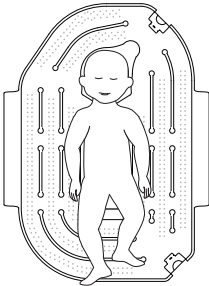
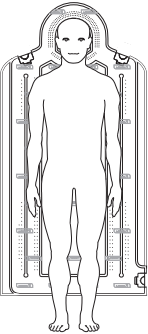
WARNINGS

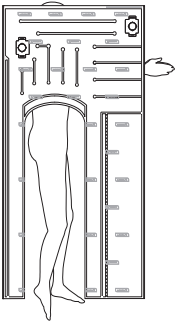
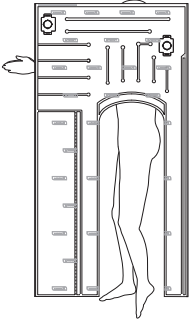
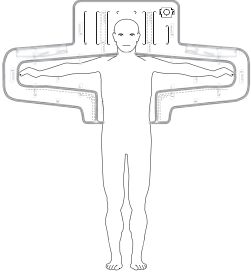
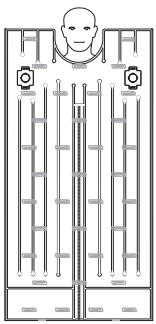
- Use with the EQUATOR[®] convective warmer (EQ-5000) and the Snuggle Warm[®] convective warmer (SW-4000). Using non-compatible convective warmers may cause damage to the convective warming blanket and thermal injury to the patient.
- Convective warming blankets can only be used in conjunction with the EQUATOR[®] convective warmer (EQ-5000) and the Snuggle Warm[®] convective warmer (SW-4000). For the safe operation of the blankets, the user must follow all warnings, cautions, and instructions provided in the Instructions for Use supplied with the compatible convective warmer, in addition to this Operator's Manual.

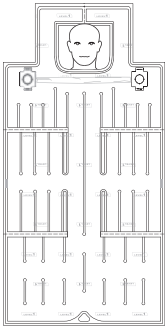
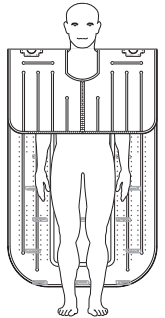
The following chart provides the description, dimensions, and hose requirements, and list of compatible convective warmers for the Snuggle Warm[®] convective warming blankets:

Convective Warming Blanket	Description	Dimensions	Hose Selection	Compatible Convective Warmers
	SW-2001 Adult Full Body Convective Warming Blanket	101.6cm W x 203.2cm L (40" W x 80" L) includes the non-inflating foot drape	SW5-HOSE7 (White)	EQUATOR [®] model EQ-5000 Snuggle Warm [®] model SW-4000
	SW-2002 Pediatric Full Body Convective Warming Blanket	101.6cm W x 146.1cm L (40" W x 57.5" L) includes the non-inflating foot drape	SW5-HOSE7 (White)	EQUATOR [®] model EQ-5000 Snuggle Warm [®] model SW-4000
	SW-2003 Upper Body Convective Warming Blanket	203.2cm W x 101.6cm L (80" W x 40" L) includes the non-inflating flaps	SW5-HOSE7 (White)	EQUATOR [®] model EQ-5000 Snuggle Warm [®] model SW-4000
				continued

Convective Warming Blanket	Description	Dimensions	Hose Selection	Compatible Convective Warmers
	SW-2004 Lower Body Convective Warming Blanket	101.6cm W x 162.6cm L (40" W x 64" L) includes the non-inflating foot drape	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2005 Neonate to Small Child Convective Warming Blanket	129.5cm W x 71.1cm L (51" W x 28" L) includes the non-inflating flaps	SW5-HOSE-N (Blue)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2006 Preemie to Neonate Convective Warming Blanket	101.6cm W x 55.9cm L (40" W x 22" L) includes the non-inflating flaps	SW5-HOSE-N (Blue)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2007 Tube Convective Warming Blanket	58.4cm W x 175.3cm L (28" W x 69" L)	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2008 Sterile Cardiac Convective Warming Blanket	101.6cm W x 162.6cm L (40" W x 64" L) includes the non-inflating foot drape	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
				continued

Convective Warming Blanket	Description	Dimensions	Hose Selection	Compatible Convective Warmers
	SW-2009 Pediatric Underbody Convective Warming Blanket	66cm W x 94cm L (26" W x 37" L) includes the non-inflating flaps	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2010 Small Upper Body Convective Warming Blanket	203.2cm W x 76.2cm L (80" W x 30" L)	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2011 Large Pediatric Underbody Convective Warming Blanket	101.6cm W x 137.1cm L (40" W x 54" L) includes the non-inflating flaps	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2013 Adult Underbody Convective Warming Blanket	101.6cm W 203.2cm L (40" W 80" L)	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
				continued

Convective Warming Blanket	Description	Dimensions	Hose Selection	Compatible Convective Warmers
	SW-2014L Left Lateral Access Convective Warming Blanket	101.6cm W 203.2cm L (40" W 80" L)	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2014R Right Lateral Access Convective Warming Blanket	101.6cm W 203.2cm L (40" W 80" L)	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2015 Upper Underbody Convective Warming Blanket	101.6cm W 203.2cm L (40" W 80" L)	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2016 Full Body Split Access Convective Warming Blanket	101.6cm W 203.2cm L (40" W 80" L)	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
				continued

Convective Warming Blanket	Description	Dimensions	Hose Selection	Compatible Convective Warmers
	SW-2018 Multi Access Convective Warming Blanket	101.6cm W 203.2cm L (40" W 80" L)	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000
	SW-2019 Poncho Convective Warming Blanket	101.6cm W 203.2cm L (40" W 80" L) includes the non-inflating flaps	SW5-HOSE7 (White)	EQUATOR® model EQ-5000 Snuggle Warm® model SW-4000

APPENDIX B

Position the Convective Warming Blanket

WARNINGS

- If the patient's nose or mouth is positioned against the convective warming blanket or the plastic drape, closely monitor the patient's breathing to prevent suffocation injury.
- Cover all open wounds in contact with the convective warming blanket to prevent airborne contamination.
- Always place the perforated side of the convective warming blanket, the side with small holes, towards the patient. Failure to do so may result in thermal injury.
- Do not use a convective warming blanket over transdermal medications as this may lead to increased drug delivery that may result in patient injury or death.
- The convective warming blanket is for single-use only. Reusing the blanket may increase the risk of cross contamination.
- Do not place objects onto the convective warming blanket that will obstruct air flow. Items on the blanket can produce localized pressure on the patient's skin, reducing cutaneous blood flow and causing thermal injury to the patient.
- For underbody blankets do not place objects, other than the patient's body, onto the convective warming blanket that will obstruct air flow. Items on the blanket can produce localized pressure on the patient's skin, reducing cutaneous blood flow and causing thermal injury to the patient.
- For the SW-2013 Adult Underbody Convective Warming Blanket, always keep the arms at the patient's side. Do not allow the patient's arms to extend outside the blanket as they may obstruct airflow through the blanket. Airflow obstruction may result in insufficient patient warming and loss of therapy.

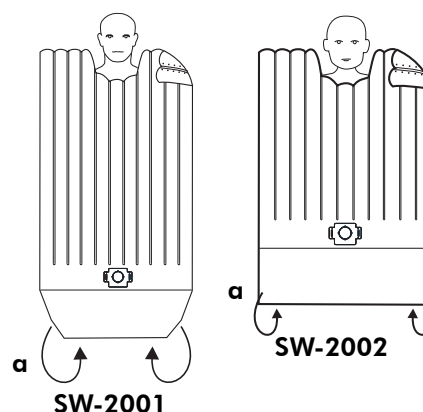
The following sections describe how to position the convective warming blanket. Refer to the page number below for the specific blanket being used.

Blanket	Page Number
SW-2001 Adult Full Body Convective Warming Blanket	B-2
SW-2002 Pediatric Full Body Convective Warming Blanket	B-2
SW-2003 Upper Body Convective Warming Blanket	B-3
SW-2004 Lower Body Convective Warming Blanket	B-3

Blanket	Page Number
SW-2005 Neonate to Small Child Convective Warming Blanket	B-4
SW-2006 Premie to Neonate Convective Warming Blanket	B-4
SW-2007 Tube Convective Warming Blanket	B-5
SW-2008 Sterile Cardiac Convective Warming Blanket	B-6
SW-2009 Pediatric Underbody Convective Warming Blanket	B-7
SW-2010 Small Upper Body Convective Warming Blanket	B-8
SW-2011 Large Pediatric Underbody Convective Warming Blanket	B-10
SW-2013 Adult Underbody Convective Warming Blanket	B-11
SW-2014L Left and SW-2014R Right Lateral Access Convective Warming Blanket	B-12
SW-2015 Upper Underbody Convective Warming Blanket	B-14
SW-2016 Full Body Split Access Convective Warming Blanket	B-15
SW-2018 Multi Access Convective Warming Blanket	B-16
SW-2019 Poncho Convective Warming Blanket	B-18

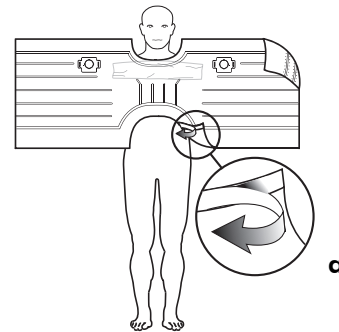
SW-2001 Adult Full Body Convective Warming Blanket and SW-2002 Pediatric Full Body Convective Warming Blanket

- 1 Place the blanket on the patient with the perforated side against the patient's skin.
- 2 Tuck the blanket flap (a) under the patient's feet.
- 3 If desired, place a light weight blanket over the convective warming blanket.
- 4 Continue with Step 4, on page 16, to attach the hose to the blanket.

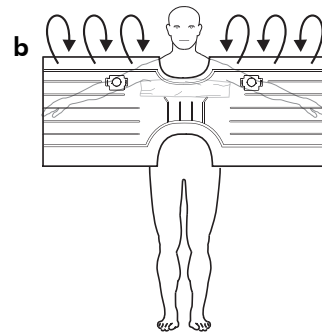


SW-2003 Upper Body Convective Warming Blanket

- 1 Place the blanket on the patient with the perforated side against the patient's skin.
- 2 Remove the paper backing from the adhesive strip (a) and tape the blanket to the patient to prevent air flow on the surgical site.



- 3 Tuck the blanket flap (b) under the patient's outstretched arms.
- 4 If desired, place a light weight blanket over the convective warming blanket.
- 5 If desired, carefully lay the clear head drape loosely over the patients's head.

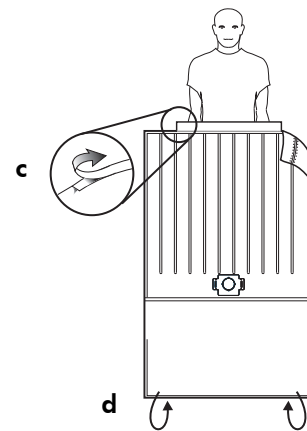


Note: Do not cover the patient's head with clear drape if the patient is not intubated and ventilated.

- 6 Continue with Step 4, on page 16, to attach the hose to the blanket.









SW-2004 Lower Body Convective Warming Blanket

- 1 Place the blanket on the patient with the perforated side against the patient's skin.
- 2 Remove the paper backing (c) from the adhesive strip and tape the blanket to the patient to prevent air flow on the surgical site.
- 3 Tuck the blanket flap (d) under the patient's feet.
- 4 If desired place a light weight blanket over the convective warming blanket.
- 5 Continue with Step 4, on page 16, to attach the hose to the blanket.

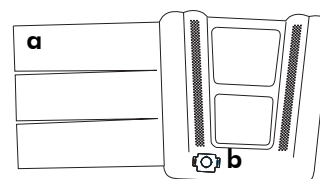


SW-2005 Neonate to Small Child Convective Warming Blanket and SW-2006 Preemie to Neonate Convective Warming Blanket

Review the following blanket positioning diagrams to determine which method to use for each age group.

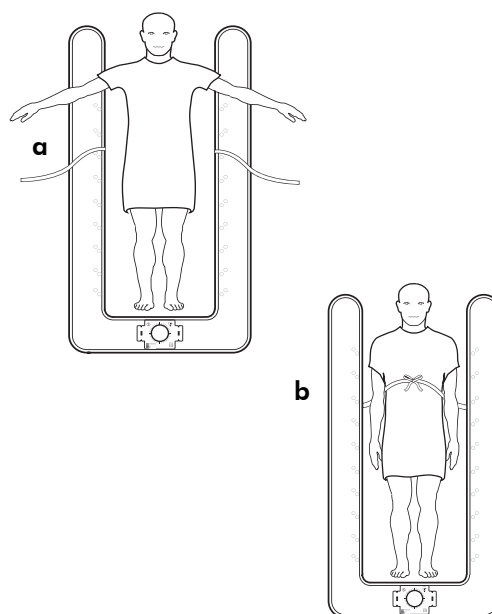
	Abdomen/Chest Access	Leg Access	Full Coverage
Preemie to Neonate			
6 to 12 Months			
12 to 30 Months			

- 1 Place the blanket on the operating room table or bed with all flaps (a) extended to the side and the hose retainer (b) facing up.
- 2 Fold the flap(s) over the perforations on the blanket at the location of the surgical site, as indicated by the white panels on the positioning diagram.
- 3 Lay the patient in the center of the blanket as indicated by the positioning diagram.
- 4 Place the remaining flap(s) over the patient as indicated by the shaded panels on the positioning diagram. Adjust the flap(s) to maximize coverage. Tuck any excess flap under the blanket.
- 5 Continue with Step 4, on page 16, to attach the hose to the blanket.



SW-2007 Tube Convective Warming Blanket

- 1** Place the blanket around the patient with the perforations facing toward the patient (**a**).
- 2** Tie the drawstrings together (**b**).
- 3** Continue with Step 4, on page 16, to attach the hose to the blanket.

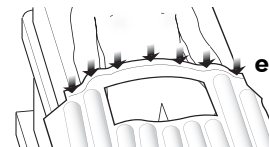
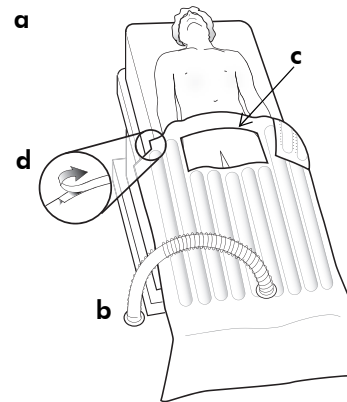


SW-2008 Sterile Cardiac Convective Warming Blanket

WARNINGS

- Do not use the SW-2008 convective warming blanket if the package is damaged or open. Sterility may be compromised and may cause death or serious injury.

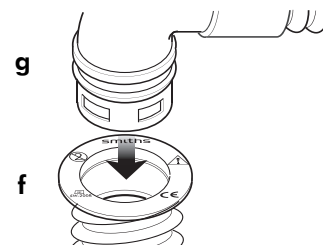
- Place the blanket on top of the patient (a) with the perforated side against the patient's skin.
- Position the blanket with the hose facing up and the collar ring accessible (b).
- Position the clear window (c) over the groin area to allow access to the region if needed.
- Remove the paper backing (d) from the adhesive strip and press the adhesive strip (e) firmly against the patient and bed to secure.



Connect the SW-2008 Hose

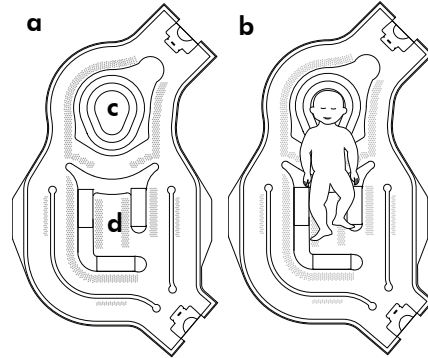
The hose for the cardiac blanket attaches differently than other blankets.

- Connect the blanket's collar ring (f) to the hose nozzle (g). Press together, making sure the hose barb snaps into the collar ring (f).
- If desired, place a lightweight blanket over the convective warming blanket.
- Continue with Step 5, on page 16, to attach the sheet clip and begin using the convective warmer.

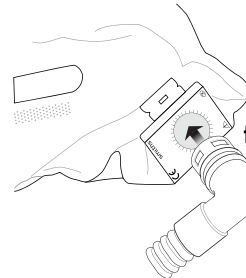
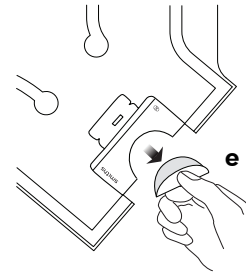


SW-2009 Pediatric Underbody Convective Warming Blanket

- 1 Place the blanket on the table with the perforated side facing up (a).
- 2 Position the patient on top of the blanket (b). Place the patient's head in the non-inflated head section (c) and the body centered between the absorbent pads (d).



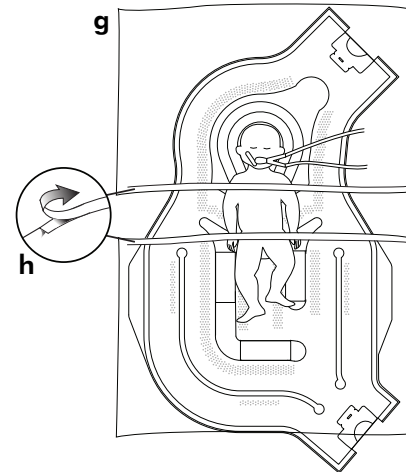
- 3 Select one of the two entry ports. Fold the port, then tear away the cardboard center in the collar ring (e).
- 4 Fold the entry port back to open the collar ring and insert the hose nozzle (f) into the collar ring. Refer to Step 4, on page 16, for more information.



- 5 If desired, carefully lay the clear drape(s) loosely over the patient (g). Remove the paper backing (h) from the adhesive strip and press the adhesive strip firmly against the patient and bed to secure.

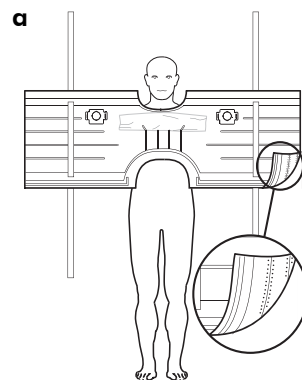
Note: Do not cover the patient's head with clear drape if the patient is not intubated and ventilated.

- 6 Continue with Step 5, on page 16, to attach the sheet clip.

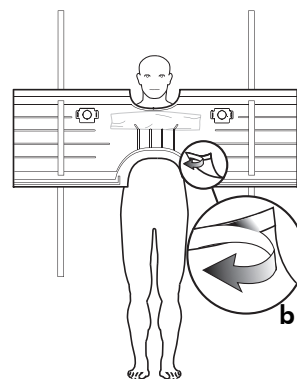


SW-2010 Small Upper Body Convective Warming Blanket

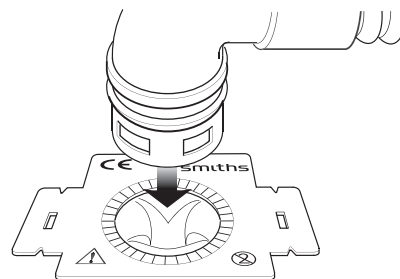
- 1 Place the blanket on the patient (a) with the perforated side against the patient's skin.



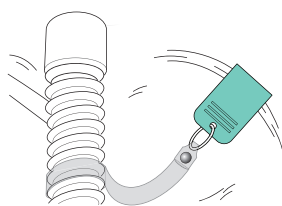
- 2 Remove the paper backing from the adhesive strip (b) and tape the blanket to the patient to prevent air flow on the surgical site.



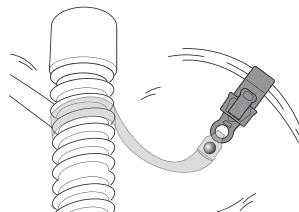
- 3 Attach the hose to the blanket. Refer to Step 4, on page 16, for more information.



- 4 Attach the sheet clip. Refer to Step 5 on page 16, for more information.

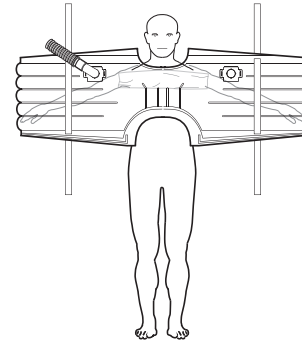


New style sheet clip



Older style sheet clip

- 5 Inflate the blanket before tying the drawstrings. Refer to Step 6, on page 17 for more information.



Note: Do not tie the drawstrings too tightly. Ensure airflow moves freely through the blanket.

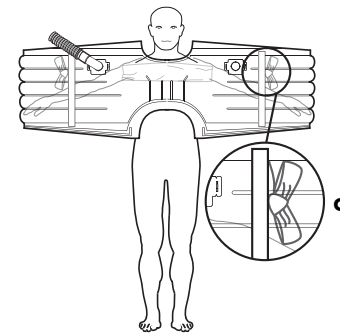
- 6 Tie the drawstrings around the patient's arms (c) to prevent the blanket from moving.

- 7 If desired, place a light weight blanket over the convective warming blanket.

- 8 If desired, carefully lay the clear head drape loosely over the patients's head.

Note: Do not cover the patient's head with clear drape if the patient is not intubated and ventilated.

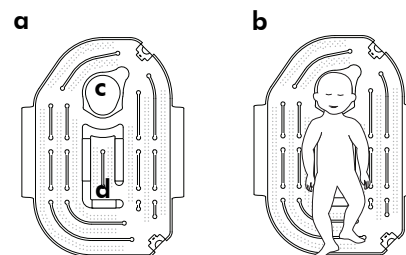
- 9 Continue with Step 6, on page 17, to begin using the convective warmer.



SW-2011 Large Pediatric Underbody Convective Warming Blanket

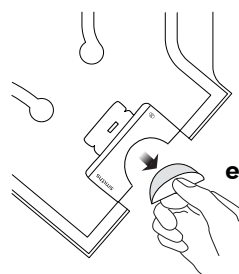
1 Place the blanket on the table with the perforated side facing up (**a**).

2 Position the patient on top of the blanket (**b**). Place the patient's head in the non-inflated head section (**c**) and the body centered between the absorbent pads (**d**).



3 Select one of the two entry ports. Fold the port, then tear away the cardboard center in the collar ring (**e**).

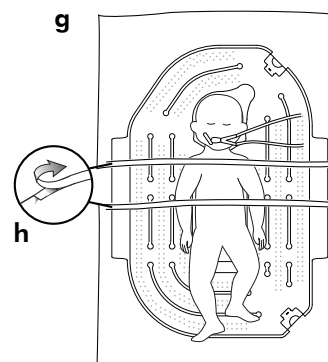
4 Fold the entry port back to open the collar ring and insert the hose nozzle (**f**) into the collar ring. Refer to Step 4, on page 16, for more information.



5 If desired, carefully lay the clear drape(s) loosely over the patient (**g**). Remove the paper backing (**h**) from the adhesive strip and press the adhesive strip firmly against the patient and bed to secure.

Note: Do not cover the patient's head with clear drape if the patient is not intubated and ventilated.

6 Continue with Step 5, on page 16, to attach the sheet clip.



SW-2013 Adult Underbody Convective Warming Blanket

- 1 Place the blanket on the table with the perforated side facing up (a).

WARNINGS

- Always keep the arms at the patient's side. Do not allow the patient's arms to extend outside the blanket as they may obstruct airflow through the blanket. Airflow obstruction may result in insufficient patient warming and loss of therapy.

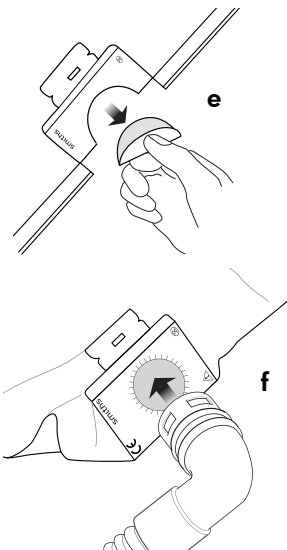
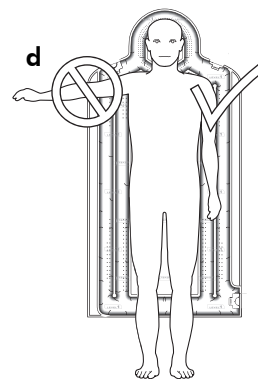
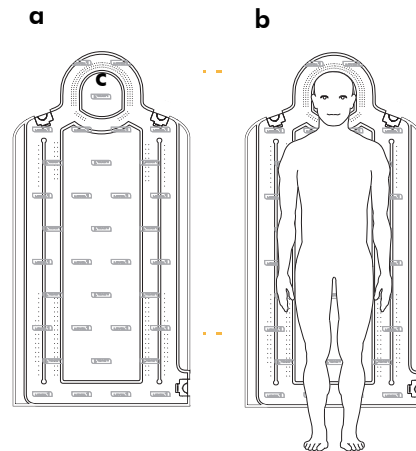
- 2 Position the patient on top of the blanket (b). Place the patient's head in the non-inflated head section (c) and center the body on the blanket.

Note: Do not allow the patient's arms to extend outside the blanket (d) as they may obstruct airflow through the blanket.

- 3 Select one of the three entry ports. Fold the port, then tear away the cardboard center in the collar ring (e).

- 4 Fold the entry port back to open the collar ring and insert the hose nozzle (f) into the collar ring. Refer to Step 4, on page 16, for more information.

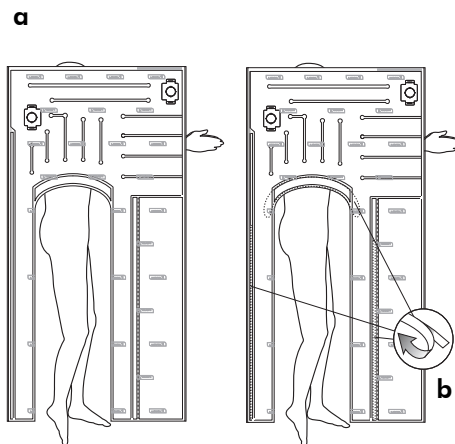
- 5 Continue with Step 5, on page 16, to attach the sheet clip.



SW-2014L Left and SW-2014R Right Lateral Access Convective Warming Blanket

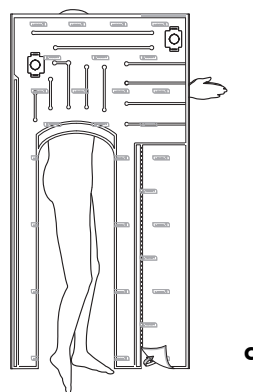
Note: Images in the following procedure show how to position the SW-2014L Left Lateral Access blanket. To position the SW-2014R Right Lateral Access blanket, follow the sequence of steps with the patient and blanket in the opposite direction.

- 1 Place the blanket on the patient (**a**) with the perforated side against the patient's skin.

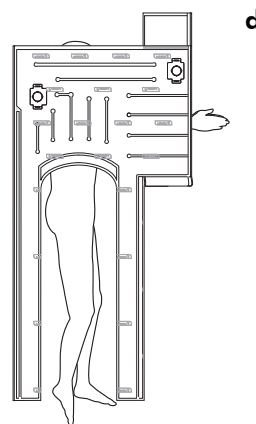


- 2 Remove the paper backing from the adhesive strips (**b**) and tape the blanket to prevent air flow on the surgical site.

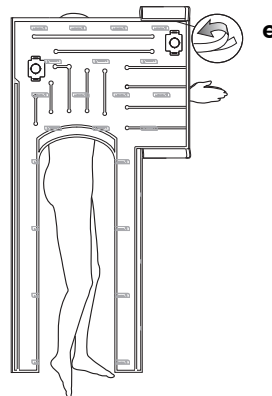
- 3 Carefully tear along the perforation (**c**) to separate the panel used to secure the blanket to the arm.



- 4 Wrap the panel under the patient's arm (**d**).



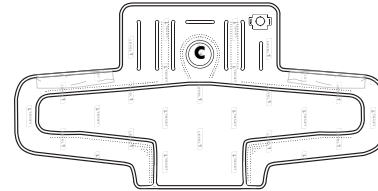
- 5 Remove the paper backing from the adhesive strip at the top of the blanket (**e**), and fasten the panel to the adhesive strip.
- 6 Continue with Step 4, on page 16, to attach the hose to the blanket.



SW-2015 Upper Underbody Convective Warming Blanket

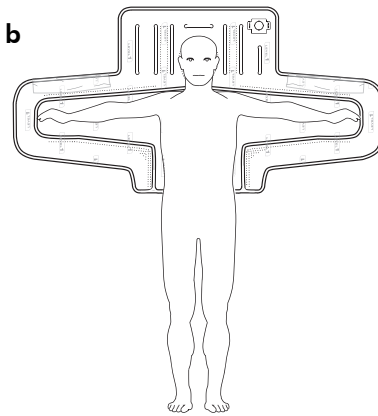
- 1 Place the blanket on the table with the perforated side facing up (a).

a



- 2 Position the patient on top of the blanket (b). Place the patient's head in the non-inflated head section (c) and the body centered on the blanket with both arms extended.

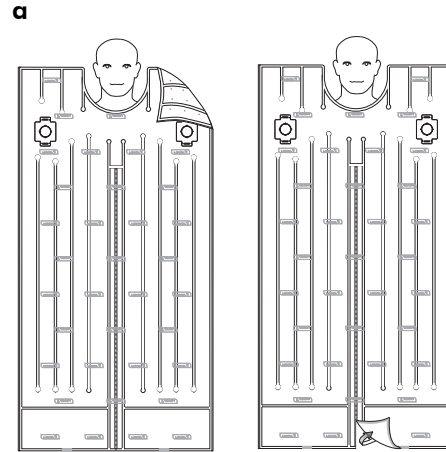
b



- 3 Attach the hose to the blanket. Refer to Step 4, on page 16, for more information.

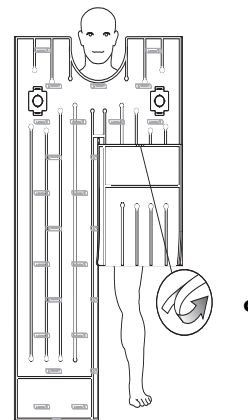
SW-2016 Full Body Split Access Convective Warming Blanket

- 1 Place the blanket on the patient (a) with the perforated side against the patient's skin.

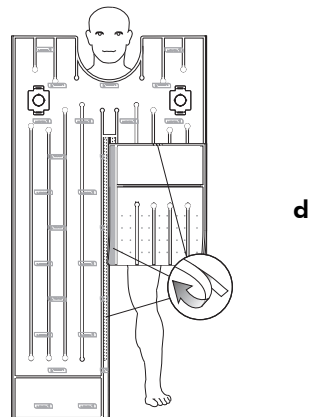


- 2 Carefully tear along the perforation (b) to access the surgical site.

- 3 Fold either the left or right panel back, remove the paper backing from the adhesive strip, and fasten the panel to the top of the blanket (c).



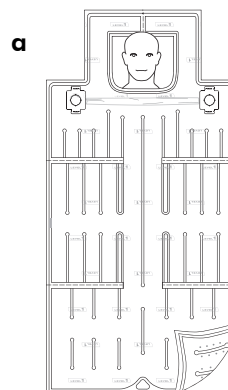
- 4 Remove the paper backing from the adhesive strips (d) and tape the blanket to prevent air flow on the surgical site.



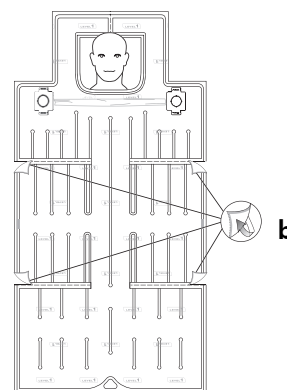
- 5 If desired, place a light weight blanket over the convective warming blanket.
- 6 Continue with Step 4, on page 16, to attach the hose to the blanket.

SW-2018 Multi Access Convective Warming Blanket

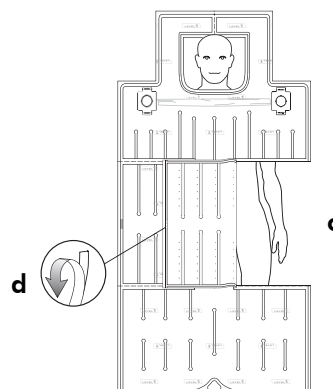
- 1 Place the blanket on the patient with the opening over the patient's head (**a**), and the perforated side against the patient's skin.



- 2 Carefully tear along the perforations at either the left or right center panels (**b**) of the blanket to access the surgical site.



- 3 Fold the panel back (**c**), remove the paper backing from the adhesive strip (**d**), and fasten the panel to the top of the blanket.

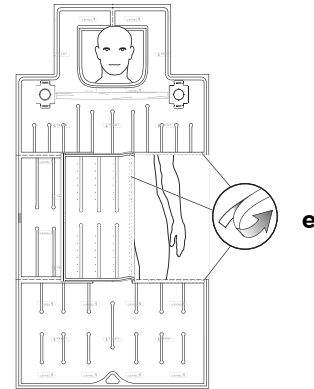


4 Remove the paper backing from the adhesive strips (**e**) and tape the blanket to prevent air flow on the surgical site.

5 If desired, carefully lay the clear head drape loosely over the patients's head.

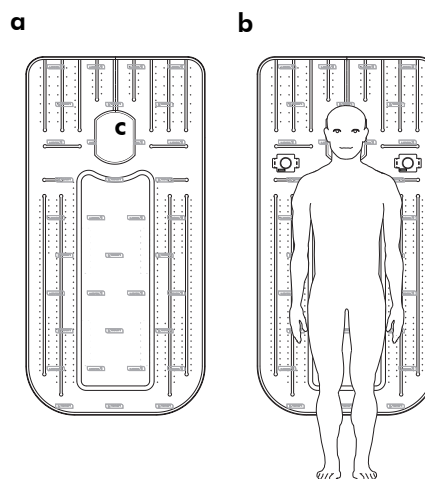
Note: Do not cover the patient's head with clear drape if the patient is not intubated and ventilated.

6 Continue with Step 4, on page 16, to attach the hose to the blanket.

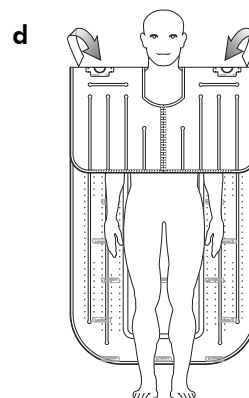


SW-2019 Poncho Convective Warming Blanket

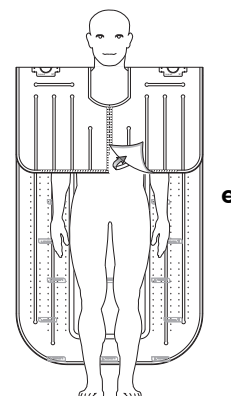
- 1** Place the blanket on the table with the perforated side facing up (**a**).
- 2** Position the patient on top of the blanket (**b**). Place the patient's head in the opening (**c**) and the body centered on the blanket.



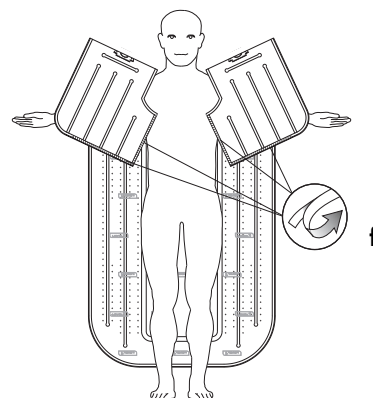
- 3** Pull the top of the blanket over the patient's head onto the upper body (**d**).



- 4** Carefully tear along the perforation in the center of the blanket (**e**) as needed.



- 5** Remove the paper backing from the adhesive strips (**f**) and tape the blanket as needed.



- 6** Continue with Step 4, on page 16, to attach the hose to the blanket.

APPENDIX C

Ordering Information

Replacement Components

REF	Product Description
SW-2001	Adult Full Body Convective Warming Blanket
SW-2002	Pediatric Full Body Convective Warming Blanket
SW-2003	Upper Body Convective Warming Blanket
SW-2004	Lower Body Convective Warming Blanket
SW-2005	Neonate to Small Child Convective Warming Blanket
SW-2006	Preemie to Neonate Convective Warming Blanket
SW-2007	Tube Convective Warming Blanket
SW-2008	Sterile Cardiac Convective Warming Blanket
SW-2009	Pediatric Underbody Convective Warming Blanket
SW-2010	Small Upper Body Convective Warming Blanket
SW-2011	Large Pediatric Underbody Convective Warming Blanket
SW-2013	Adult Underbody Convective Warming Blanket
SW-2014L	Left Lateral Access Convective Warming Blanket
SW-2014R	Right Lateral Access Convective Warming Blanket
SW-2015	Upper Underbody Convective Warming Blanket
SW-2016	Full Body Split Access Convective Warming Blanket
SW-2018	Multi Access Convective Warming Blanket
SW-2019	Poncho Convective Warming Blanket
SW5-HOSE7	Hose Assembly, 2.1 m (7 ft.)
SW5-HOSE-N	Neonatal Hose, 1.5 m (5 ft.)
F3-5000	Filter Assembly

Accessories

REF	Product Description
CW-5000	Cord Wrap
SC-5000	Sheet Clip Assembly
RC-5000	Rolling Cart

Numerics

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40°C Temperature Setting Button 13
44°C Temperature Setting Button 13

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